

Claims

1. A method of producing an electrical circuit element comprising an elongate electrical conductor (1) encircled by magnetic material (2) extending along at least a part of said conductor,

characterised in that at least a first sacrificial layer (10) is formed above and across said conductor (1), at least part of said first sacrificial layer (10) is removed to leave a space (12, 13) above and across said conductor, a fluid (16) comprising magnetic nanoparticles dispersed in a liquid dispersant is introduced into said space (12, 13), and said dispersant is removed leaving said magnetic nanoparticles densely packed in said space (12, 13) as at least part of said magnetic material (2).
2. A method of producing an electrical circuit element as claimed in claim 1, including forming a support layer (8) with a cavity (12), forming a layer of said magnetic material (2) in said cavity (12), forming said electrical conductor (1) over said layer of said magnetic material, and forming said first sacrificial layer (10) overlapping said electrical conductor and said layer of said magnetic material.
3. A method of producing an electrical circuit element comprising an elongate electrical conductor (1) encircled by magnetic material (2) extending along at least a part of said conductor,

characterised in that first (10) and second (7) sacrificial layers are formed across said conductor (1) respectively above and below the conductor, at least parts of said sacrificial layers (7, 10) are removed to leave a space (12) encircling said conductor, a fluid (16) comprising magnetic nanoparticles dispersed in a liquid dispersant is introduced into said space (12), and said dispersant is removed leaving said magnetic nanoparticles densely packed in said space (12) as at least part of said magnetic material (2).
4. A method of producing an electrical circuit element as claimed in claim 3, including forming a support layer (8) with a cavity (12), forming said second

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sacrificial layer (7) in said cavity, forming said electrical conductor (1) over said second sacrificial layer (7), and forming said first sacrificial layer (10) overlapping said electrical conductor and said second sacrificial layer.

5. A method of producing an electrical circuit element as claimed in claim 3 or 4, wherein said support layer (8) comprises electrically insulating material, and said conductor (1) is deposited over said second sacrificial layer (7) and at least part of said layer of insulating material (8).
6. A method of producing an electrical circuit element as claimed in claim 5, wherein said first sacrificial layer (10) is surrounded by a further layer of insulating material (11) formed over the first said layer (8) of insulating material.
7. A method of producing an electrical circuit element as claimed in any preceding claim, wherein said sacrificial layer or layers (7, 10) comprise an organic material.
8. A method of producing an electrical circuit element as claimed in any preceding claim, wherein said sacrificial layer or layers (7, 10) comprise a photo-resist material, and producing said sacrificial layer or layers includes forming a layer or layers of said photo-resist material, exposing said photo-resist material in a pattern defining the geometry of said sacrificial layers and selectively removing photo-resist material, and removing said parts of said sacrificial layers comprises dissolving them in a solvent.
9. A method of producing an electrical circuit element as claimed in any preceding claim, wherein a further layer (14) of sacrificial material is formed above said conductor with at least one aperture (15) corresponding to said space (12) to contain said fluid (16) before removal of said dispersant.
10. A method of producing an electrical circuit element as claimed in any preceding claim, and comprising forming a protective layer (19) over said magnetic material (2).

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11. A method of producing an electrical circuit element as claimed in any preceding claim, wherein said magnetic nanoparticles are ferromagnetic.
12. A method of producing an electrical circuit element as claimed in any preceding claim, wherein said magnetic material (2) presents an easy axis of magnetisation extending along said conductor (1).
13. A method of producing an electrical circuit element as claimed in any preceding claim, wherein removing said dispersant comprises evaporating it.
14. A method of producing an electrical circuit element as claimed in any preceding claim, and comprising applying a magnetic field to said magnetic material while said dispersant is being removed.
15. An electrical circuit element produced by a method as claimed in any preceding claim.
16. A meander-type inductive element comprising a plurality of juxtaposed substantially parallel electrical circuit elements as claimed in claim 15 and at least one electrical interconnection between adjacent ends of the electrical conductors (1) of respective ones of said juxtaposed electrical circuit elements.